Government of Western Australia
Department of Fisheries

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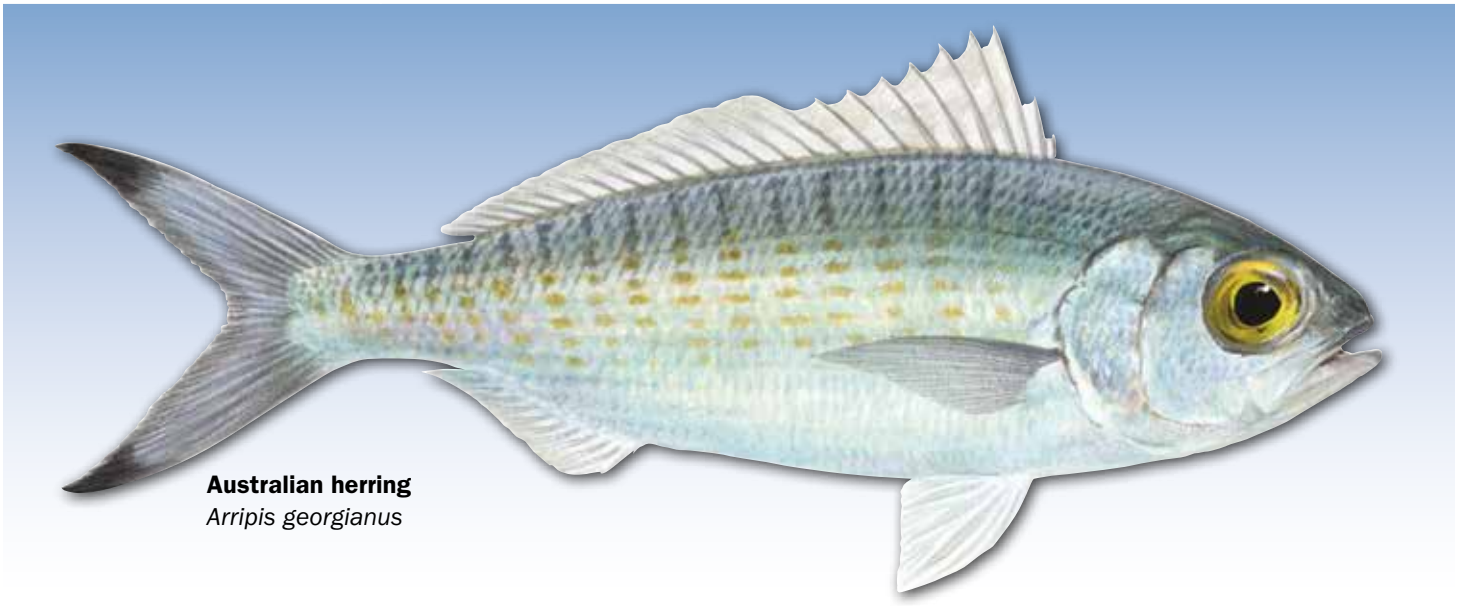
Fish for the future

FISHERIES FACT SHEET

AUSTRALIAN HERRING



Australian herring
Arripis georgianus

Australian herring

A staple fish for recreational fishers in the south of the State, and historically for commercial fisheries, Australian herring is a popular species with a life cycle dependent on prevailing currents.

Family likeness

Although named after their superficial resemblance to the herring found in the Northern Hemisphere, Australian herring are actually a member of the perch family (family *Arripidae*) rather than a true herring (family *Clupeidae*).

Sometimes known as a 'tommy ruff' in South Australia and Victoria, Australian herring is now the standard adopted name for the species throughout its entire distribution.

There are four members of the *Arripidae* family, including the western Australian salmon (*Arripis truttaceus*), which in its juvenile stage can be easily confused with adult herring.

Herring have been reported to grow to a maximum length of 41 centimetres but are generally caught at a length of around 20-25 centimetres. Larger adults are often referred to as 'bull' herring.

Australian herring typically reach sexual maturity at a length of about 20 centimetres for females and 18 centimetres for males. This corresponds to an age of between two and three years.

Identifying Australian herring and juvenile Australian salmon

Juvenile Australian salmon (*Arripis truttaceus*) are silvery white, smooth scaled, have a yellow pectoral fin and have several rows of golden or brown spots on their backs and sides.

Adult Australian salmon

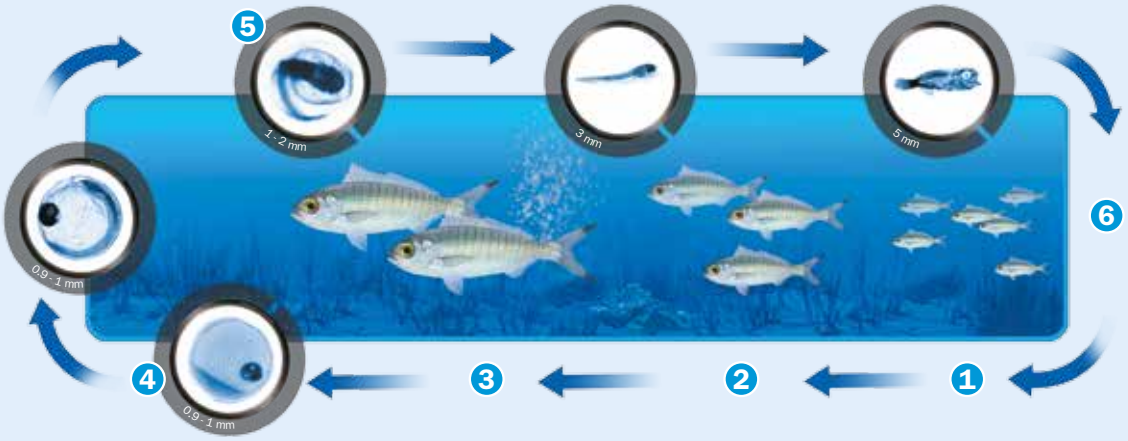
Australian herring (*Arripis georgianus*) are silvery in colour with vertical rows of golden spots on the upper side of the body and black tips to the caudal (tail) fin. The scales on the body are slightly rough in texture.

Juvenile Australian salmon

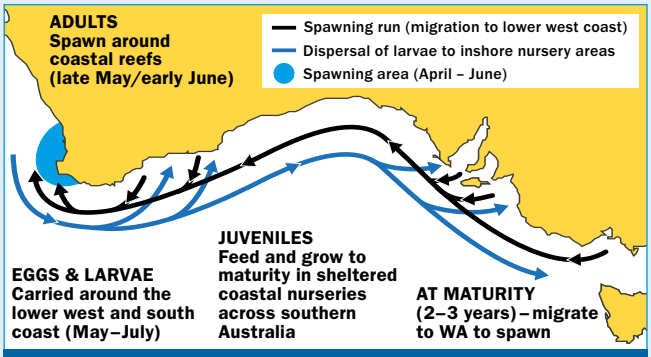
Australian herring have a larger eye and more rounded head than juvenile Australian salmon.

Adult Australian herring

Life cycle



1. Juvenile Australian herring feed and grow in sheltered nursery sites in bays and nearshore waters along the lower west coast of WA and the southern Australian coast (including South Australia and Victoria), moving to more exposed coastal habitats as they grow larger. Juveniles feed on small invertebrates (mainly crustaceans) that live among driftweed and seagrass.
2. Most herring reach sexual maturity at two to three years of age. At maturity, young herring along the southern coast of Australia migrate to the spawning area on the lower west coast of WA. Migrating fish join with other adults already resident on the west coast.
3. Spawning occurs in marine waters of the lower west coast of WA. Spawning takes place over a short period of time, between late May and early June.
4. The number of eggs released by each female depends on their size – a 20 cm female releases about 50,000 eggs while a 33 cm female releases about 200,000 eggs.
5. Planktonic eggs, larvae and juveniles are carried southwards along the west coast and then back eastward along the south coast by prevailing winds and currents, particularly the Leeuwin Current.
6. The tiny juveniles (30-60 mm length) settle during winter/spring into nursery sites along the south coast, as far east as South Australia and Victoria. Some juveniles also settle close to where they were spawned along the lower west coast of WA, particularly in Geographe Bay, which is thought to be an important source of recruitment for the west coast fishery.



The life cycle of the Australian herring is highly influenced by the Leeuwin Current.

A one-way trip

After spawning, adult fish stay in Western Australia and remain on the west coast (there is no return migration to the south coast). These adult fish disperse throughout coastal waters, some move into estuaries and others move north up the west coast as far as Shark Bay.

Adults feed inshore on a range of small fish and crustaceans. Those that enter estuaries may encounter more abundant food, and may grow larger and fatter than their coastal relatives.

Sometimes young herring enter estuaries along the south coast and become trapped inside by a closed sand bar. They can remain there for long periods without breeding, growing fat on the abundant food.

Southern stock

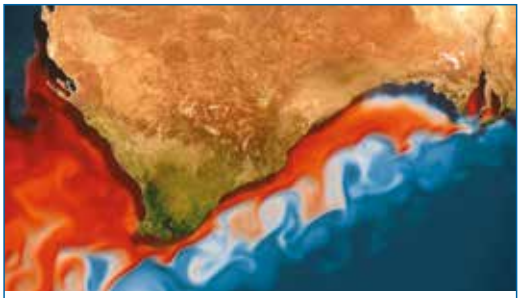
An endemic Australian species, herring occur in the coastal waters of southern Australia, from Shark Bay in Western Australia to Port Phillip Bay in Victoria. They are found inshore and around offshore islands (e.g. Rottnest Island in WA and Kangaroo Island in SA), and in the lower parts of estuaries. Australian herring consist of one genetic stock of fish.

Leeuwin lifeline

The herring's life cycle is highly influenced by the Leeuwin Current, which transports warm tropical water southwards along the continental shelf of the WA coast.

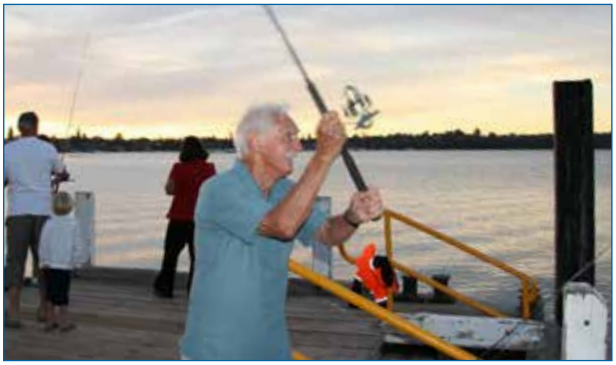
In years when the Leeuwin Current is strong, pre-spawning adults tend not to travel as far up the west coast because they are swimming against the current. However, a strong current will transport and disperse larvae all along the south coast to Victoria. In years of a weak current, most larvae remain in Western Australian waters, recruiting to nurseries in the lower west coast, close to where they were spawned.

These factors in turn affect juvenile recruitment success, and the catchability and abundance of adult fish.



The life cycle of the Australian herring is highly influenced by the Leeuwin Current.

Recreational fishing favourite



Despite their small size, herring are highly acrobatic fish that are a favourite among both novice and experienced recreational fishers. A herring school can be 'berlied up' into a feeding frenzy by using berley consisting of pollard and fish oils. In this situation it is possible to catch a fish nearly every cast.

Australian herring has historically been the most common finfish species retained by recreational fishers in WA. Shore-based fishers are estimated to take the majority (60-70 per cent) of the catch, with the remainder taken by boat-based fishers. Each year, herring is typically the most common finfish species in the shore-based catch and the second most common (after whiting) in the boat-based catch.

Measure of maturity

Herring can potentially live for 12 years. However, most fish caught by recreational and commercial fisheries are aged only one to four years, with fish up to 10 years rarely caught. This suggests that the stock experiences a high rate of mortality due to fishing and predation. Also, since herring mature at two to three years, most fish are only being allowed a very limited opportunity to breed before being caught.

It is estimated that between 50 and 75 per cent of all herring caught nationally each year (including commercial and recreational landings) have not had a chance to spawn prior to capture. Nearly all fish taken along the southern coast of Australia are yet to spawn.

Monitoring the annual age structure of the herring population to determine the proportion of older fish is one method that Department of Fisheries researchers use to assess whether the current level of fishing pressure is sustainable.

Growth rings in a herring otolith (earbone) can be counted to determine the fish's age.

Fishy science

The significant reduction in commercial fishing for herring since the 1990s means commercial catch rates have been increasingly less reliable as an index of herring abundance.

As a result, the reliance on recreational fishing data has grown. Catch rate data collected since 2005 from Research Angler Program (RAP) logbooks provides a more reliable picture of abundance in many areas.

The Department of Fisheries also conducts annual beach seine sampling to survey juvenile herring. This gives an indication of recruitment from year-to-year and is used to forecast adult abundance and fishery catches two-to-three years later. Recruitment since 2000 has been very low in both the lower west and south coasts when compared to the late 1990s.

Surveys of the recreational catch of herring in the West Coast Bioregion in the 1990s and more recent years found females accounted for 60-70 per cent of the total annual catch and up to 85 per cent of the catch taken during autumn (the spawning period). It is thought that females may need to feed more vigorously when producing eggs. Given they are heavily targeted by fishers during their spawning period over autumn, catching such a high percentage of pre-spawning females is a concern for fisheries managers.

The Department's recent research has focused on determining the age structure (how many individuals of each year class are present) of the herring stock. Researchers are able to determine the fishes' age from their otoliths (or ear bones). Researchers are also trying to determine what proportion of the herring catch is coming from each nursery area. Differences in juvenile otolith shape and chemical composition can provide a unique 'nursery signature' that can be used to tell where the adult fish originate from.

Our research shows the herring stock has been depleted and the overall catch of herring must be halved to reduce the impact of fishing and provide the best opportunity for recovery.

This research was part of the most rigorous assessment of nearshore finfish species ever carried out in the West Coast Bioregion. We used the 'weight of evidence' approach, which means using all available information to determine the stock status.

Both environmental factors and fishing pressure were identified as contributing to the concerns over herring.

Fine mesh beach seine nets are used to sample juvenile Australian herring at key locations.

Survival schools

Herring are food for many predators such as Australian salmon, mulloway, yellowtail kingfish, sea birds, seals and sea lions. They school in large numbers – an essential defence mechanism against these predators – and hover over seagrass meadows and reefs, which gives them additional protection. They normally school at depths of only one to two metres from the surface.

Commercial fisheries

Following research showing the herring stock was depleted and the overall catch must be halved to provide the best opportunity for recovery, the commercial South Coast G-net Fishery was closed in March 2015.

Historically, this fishery took the bulk of WA's commercial catch using long trap nets on a limited number of south coast beaches.

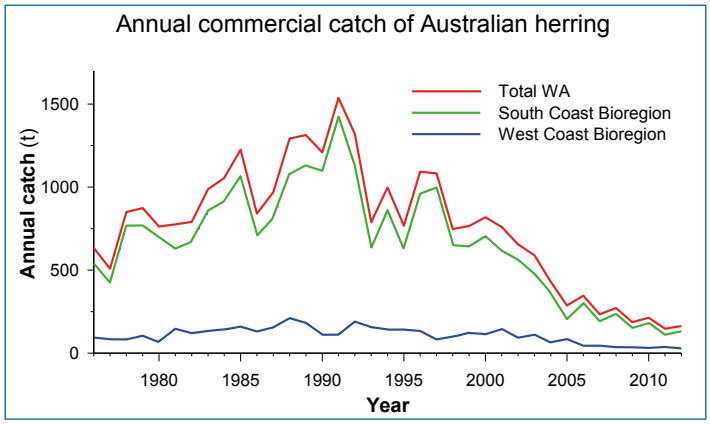
Traditionally, the catch was sold to the fresh fish markets or as bait for the western rock lobster and southern rock lobster fishing industry and as animal feed. Management strategies to help the herring stock recover have prioritised the need to use herring for recreational purposes and human consumption.

The commercial South Coast G-net Fishery was closed in March 2015 to help the herring stock recover. Photo: Sandy Clarke

A small amount of herring is still taken commercially by seine nets, gill nets and line fishing on both the west and south coasts.

At its peak in the early 1990s, the commercial herring catch was more than 1,500 tonnes. Since that time both catch and effort have declined significantly. They reached historically low levels in 2011 and remained very low in 2012.

The decline in commercial catch and effort has been influenced by economic factors such as low marketability as well as reduced availability of fish in many regions. Fish processors have effectively restricted the commercial catch in recent years by purchasing only limited quantities of herring.



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Glossary

Age structure
The number of fish of different ages within a population

Berley
Surface level bait consisting of fish oils and pollard aimed at attracting fish

Catch
Total number or weight of fish caught in a specified time.

Effort
The amount of time spent fishing by a given group of fishers

Endemic
Restricted to, or only found in, one place

Maturity
Stage at which a fish can reproduce or breed

Migrate
To move regularly from one habitat to another, usually for purposes of breeding or spawning

Nursery area
Area where juvenile fish grow

Otolith
Fish ear bone

Predator
Animal that lives by preying upon other animals

School
A large number of fish of the same type moving together as a group

Spawn
To produce or deposit sperm or eggs

West Coast Bioregion
From approximately Augusta to Kalbarri

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FURTHER INFORMATION

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